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The Economic Impact of a Sales Tax Reduction on Manufacturing Equipment

PREPARED FOR: CALIFORNIA MANUFACTURERS & TECHNOLOGY ASSOCIATION

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Key Findings

This paper examines the impact of a sales tax reduction of 5 percent and alternatively, a reduction of 3 percentage points on the purchases of manufacturing and telecommunications equipment.

Exempting manufacturing equipment from the 5 percent sales tax results in an average of 50,000 new jobs per year over the next 10 years, of which 14,000 are created in the manufacturing sector. With a 5 percent reduction, state tax revenues from higher economic activity increases by $624 million by the fifth year, offsetting the loss of $510 million in tax revenues that would have been collected by the state, resulting in a net revenue gain of $114 million.

A reduction of the sales tax on manufacturing equipment from 5 percent to 2 percent results in an average of 32,000 new jobs per year over the next 10 years, of which 8,000 are created in the manufacturing sector. With a 3% reduction, state tax revenues from higher economic activity increases by $373 million by the fifth year, offsetting the loss of $307 million in tax revenues that would have been collected by the state, resulting in a net revenue gain of $66 million.

These findings indicate that enacting this sales tax reduction would lead to higher capital formation, promote greater job and income growth, and after an initial loss, ultimately increase tax receipts in California.

Executive Summary

Manufacturing's Role in California's Economy

The economic growth potential of California and other states is largely dependent upon the performance of the industries that produce goods and services for sale beyond their borders, and the manufacturing sector of a state is its most export-intensive activity. The income that manufacturing generates provides one of the major stimuli to a state and local economy by circulating, multiplying and generating much of the regional employment base.

A state's tax structure of capital and labor influences whether it retains its existing industries, firms and people, and whether it attracts new investment for expansion. Any explanation of variations in state growth patterns must recognize that there are few barriers to the flow of economic activity across borders. States actively and openly compete for new and expanding businesses. Decisions on where to build manufacturing production facilities are especially sensitive to differences in taxes and business costs, while research and development activities are less so.

California has many comparative disadvantages in business-cost areas. California is the third highest cost-of-doing business state in the country after Connecticut and Massachusetts. California's composite tax and business costs are 32 percent above the national average. California manufacturers face difficulty in producing their products at profitable levels in the state given the immense competitive pressures stemming from globalization.

- California's manufacturing sector is the largest in the country and a vital component of the state's economy.

- Manufacturing represents 13 percent of California's employment base and produces 14 percent of its gross state product.

- High-tech manufacturing (computers, communications equipment, electronic components, etc.) accounts for almost 40 percent of the state's manufacturing jobs.

- Manufacturing comprises a large share of California's high-tech base and assists in distinguishing the state as a technology center. Nevertheless, the current recession has hit California's manufacturing sector hard as employment has declined 6.6 percent (129,300 jobs lost) over the past 13 months through April 2002, primarily in high-tech manufacturing. The last time manufacturing employment declined in California was in the fourth quarter of 1998 when 86,000 jobs were lost through January 1999.

Sales Tax on Manufacturing Equipment

In an attempt to re-energize California's manufacturing sector, the California Manufacturers & Technology Association (CMTA) has proposed three economic stimulus measures. The focus of this report is to analyze the economic impact of one of those three measures: a reduction in the state's 5 percent sales tax for purchases of manufacturing equipment and telecommunications equipment used in the manufacturing process. In this study, we also estimate the impact of a three-percentage-point reduction in this tax from 5 percent to 2 percent.

California is one of four states currently imposing a sales tax on purchases of manufacturing and telecommunications equipment. Alabama, South Dakota and Wyoming are the other three. However, these states have a much lower overall tax burden than California. Several don't have corporate or personal income tax and all three offer a broad range of business incentives targeted at promoting economic growth.

California's taxable base from the purchase of manufacturing equipment is determined by the total value of capital expenditures on manufacturing and telecommunications-related equipment. This equipment is utilized in several

manufacturing industries, but particularly in computers and machinery, electrical equipment and instruments.

Eliminating or reducing sales tax on manufacturing equipment would lower capital costs and boost investment in productive capacity through expansion or building of new manufacturing facilities in the state. More importantly, either measure would create new skilled jobs for California residents and result in higher labor migration into the state.

Two alternative scenarios were examined by the Milken Institute: reducing the sales tax on purchases of manufacturing and telecommunications equipment by the full 5 percent, described in this report as the "5% Sales Tax Reduction," and reducing it by three percentage points to 2 percent, described as the "3% Sales Tax Reduction."

The economic impact was evaluated over a 10-year period. The results were compared to baseline scenario where no reduction in sales tax takes place.

Impact of Eliminating the 5 Percent Tax on Manufacturing Equipment

- Exempting manufacturing equipment from the 5 percent sales tax results in an average of 50,000 new jobs a year over the next 10 years, of which 14,000 are created in the manufacturing sector.

- By the fifth year, employment increases by 3,100 in the machinery and equipment sectors, 5,200 in electrical equipment and 3,000 in instruments. In total, jobs in these three sectors are boosted by 1.9 percent.

- By the fifth year, nonmanufacturing employment rises by 42,000, displaying manufacturing's high multiplier impact on the rest of the economy. Job increases in other sectors include 15,200 in services, 8,400 in retail trade, 4,700 in construction, 4,100 in wholesale trade and 3,500 in finance, insurance and real estate.

- Total output (fixed 1992$) increases by $10.9 billion after five years. Of that, manufacturing increases by $7.4 billion.

- Gross state product (fixed 1992$) rises by $5.7 billion, personal income by $3.9 billion, and population by 54,300 after five years.

- State tax revenues from higher economic activity increase by $624 million by the fifth year, offsetting the $510 million loss in tax revenues that would have been collected by the state — a net revenue gain of $114 million.

Impact of 5% Sales Tax Reduction on Manufacturing and Telecomm. Equipment

Difference From Baseline

Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Total Employment (Thousands)	**23.920**	**46.370**	**49.960**	**54.250**	**56.960**
Manufacturing	6.853	13.000	13.550	14.420	15.010
Non-Manufacturing	17.067	33.370	36.410	39.830	41.950
Total Output (Billions, Fixed 92$)	**3.728**	**7.554**	**8.556**	**9.833**	**10.890**
Manufacturing	2.368	4.910	5.616	6.552	7.379
Non-Manufacturing	1.360	2.644	2.941	3.281	3.512
Gross Regional Product (Billions, Fixed 92$)	1.860	3.817	4.396	5.107	5.712
Personal Income (Billions, Nominal $)	1.236	2.556	3.012	3.482	3.880
Additional State Revenues (Billions, Nominal $)	0.260	0.458	0.517	0.577	0.624
Foregone Tax Revenue (Billions, Nominal $)	0.445	0.460	0.478	0.494	0.510
Net State Revenue (Billions, Nominal $)	-0.185	-0.003	0.039	0.083	0.114

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census

Impact of 3 Percent Tax Reduction on Manufacturing Equipment

- A sales tax reduction on manufacturing equipment from 5 percent to 2 percent results in an average of 32,000 new jobs a year over the next 10 years, of which 8,000 are created in the manufacturing sector.

- By the fifth year, employment increases by 1,900 in the machinery and equipment sectors, 3,100 in electrical equipment and 1,800 in instruments. In total, jobs in these three sectors are boosted by 1.2 percent.

- By the fifth year, nonmanufacturing employment rises by 26,000, displaying the high multiplier impact on the rest of the economy. Increases in jobs in other sectors include 9,500 in services, 5,200 in retail trade, 3,000 in construction, 2,600 in wholesale trade and 2,200 in finance, insurance and real estate.

- Total output (fixed 1992$) increases by $6.7 billion after five years. Of that, manufacturing increases by $4.5 billion.

- Gross state product (fixed 1992$) rises by $3.5 billion, personal income by $2.4 billion, and population by 32,000 after five years.

- State tax revenues from higher economic activity increase by $373 million by the fifth year, offsetting the loss of tax revenues that would have been collected by the state of $307 million — a net revenue gain of $66 million.

Impact of 3% Sales Tax Reduction on Manufacturing & Telecomm. Equipment

Difference From Baseline

Variable	Year 1	Year 2	Year 3	Year 4	Year 5
Total Employment (Thousands)	**10.730**	**21.770**	**28.120**	**35.600**	**35.230**
Manufacturing	3.144	6.174	7.654	9.438	9.228
Non-Manufacturing	7.586	15.596	20.466	26.162	26.002
Total Output (Billions, Fixed 92$)	**1.696**	**3.573**	**4.818**	**6.419**	**6.685**
Manufacturing	1.093	2.337	3.161	4.257	4.508
Non-Manufacturing	0.603	1.236	1.657	2.163	2.177
Gross Regional Product (Billions, Fixed 92$)	0.844	1.802	2.467	3.319	3.502
Personal Income (Billions, Nominal $)	0.557	1.201	1.668	2.226	2.379
Additional State Revenues (Billions, Nominal $)	0.118	0.215	0.281	0.358	0.373
Foregone Tax Revenue (Billions, Nominal $)	0.267	0.275	0.285	0.298	0.307
Net State Revenue (Billions, Nominal $)	-0.149	-0.060	-0.004	0.060	0.066

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census

From a state public policy perspective, this change in tax structure would create thousands of high-paying jobs in manufacturing and add thousands more in non-manufacturing sectors. Ultimately, the loss in tax revenue is offset by additional revenue from higher economic activity. By the fourth year after the policy change, it results in a net revenue gain.

Manufacturing's Role in State Economic Performance

Many of the same factors that determine national economic performance influence the long-term economic growth potential for California and other states. States are dependent upon the growth of industries that produce goods and services for sale beyond their borders, and the manufacturing sector of a state is its most export-intensive activity. The output generated by export sectors such as manufacturing is primarily consumed outside the state. The income that manufacturing generates, however, provides one of the major stimuli to the local economy by circulating, multiplying and generating much of the regional employment base in construction, transportation, utilities and communications, finance, insurance and real estate, wholesale and retail trade, services, and even state and local government.

U.S. long-term economic growth has more rigid constraints than those placed on a state's ability to expand over the long term. For example, labor is highly mobile between U.S. states as individuals and firms respond to differences in relative economic-performance factors. Labor supply at the national level is largely predetermined, with the exception of immigration policy. Migration trends between states and regions, however, can greatly alter their long-term potential growth rates.

Many factors interact in a complex, dynamic environment to cause state growth disparities within a national system over the long term. The existing industrial structure or mix of industries plays an important role. Each state inherits its current industrial structure from a series of historically determined factors. The existing industrial structure can influence growth for a long period of time. The tax structure of capital and labor influences whether regions retain their existing industries, firms and people, and whether they attract new investment for expansion. Factors that determine firm and individual location choices include cost-of-doing-business measures — tax rates, capital costs, wage rates, real estate space and energy costs — along with labor force skills, access to markets, access to capital, research, development and innovation capacities, and, increasingly, quality-of-place issues.

While these factors are listed as individual elements of state's growth process, in fact, they interact profoundly to develop a dynamic and self-sustaining process of growth and decline. State cost differentials can act as the initial impetus influencing relative state economic growth trends. This soon leads to changes in state variation of industrial structure, which reinforces the impact of cost differentials. The cost of doing business explains a large proportion of the long-term state growth disparity in the United States. Our research indicates that tax structure and relative wages are the dominant cost-of-doing-business measures to explain variations in state economic growth.

Higher taxes and other cost-of-doing business measures account for much of manufacturing's migration from the Northeast and Midwest to the South and West

over the past 30 years. Deciding where to put manufacturing production facilities is especially sensitive to differences in taxes and business costs, while research and development activities are less sensitive to them. However, for energy-intensive firms, electricity and natural gas costs increase in relative importance in firm site-selection criteria. Low business costs and taxes may not be as critical in determining the location of firms in the information age as they were in the industrial age, but they are important elements in where manufacturers choose to produce.

Any analytical system attempting to explain variations in state growth patterns must take into account that there are few barriers to the flow of economic activity across borders. States actively and openly compete for new and expanding businesses that largely determine long-term economic growth patterns between them. Since most manufacturing firms find it difficult to achieve high levels of product differentiation, they must charge similar prices for their products in national and international markets regardless of their place of origin. Consequently, differences in profitability are tied to differences in relative costs and taxes. Since greater profitability means higher returns to capital invested in a state, its share of manufacturing investment is inversely related to relative costs and taxes.

Some studies have shown that business-related taxes are not significantly related to geographic-based investment decisions. However, research undertaken at the Milken Institute and at other research centers, both cross-sectional and time series, strongly indicates that business-related taxes are very important when combined with other costs. Indeed, business-related taxes and other costs are highly significant in explaining the location of manufacturing production facilities.

California's Competitive Position in Manufacturing

Manufacturing's 14.2 percent share of California GSP is the largest among the high-cost states, indicating that California has successfully maintained a higher manufacturing base in its economy than other high-cost states. Proximity to California's deep research and development assets explains manufacturing's greater concentration here than other high-cost states. Still, California is increasingly exposed to losing manufacturers to other U.S. and offshore locations as its relative costs continue to deteriorate.

California lost a higher percentage of manufacturing jobs in the 1990s than any other major manufacturing state. Many of these jobs were in aerospace and defense-related areas, but even fabricated metals and chemicals fared worse in the state. California has been losing high-tech manufacturing production jobs to other western states in recent years largely due to lower tax burdens and greater incentives offered as displayed in the chart below. For example, Intel has not built a production facility in California since 1988, while constructing many facilities in other western states.

High-Tech Manufacturing Employment
Selected States

		1990	2000	Growth 90 - 00
5	Oregon	33.2	55.2	66.3%
18	Arizona	86.3	88.2	2.2%
19	Texas	228.4	232.6	1.8%
	United States	3270.9	2925.9	-10.5%
30	Utah	33.5	29.3	-12.5%
32	Washington	145	123.7	-14.7%
33	Colorado	70.7	60.3	-14.7%
39	California	737.8	606.1	-17.9%
46	Massachusetts	183.0	134.8	-26.3%

Sources: Economy.com, BLS

California manufacturers have access to some of the nation's leading private and federal research laboratories and university-based research and development facilities located here, providing them with access to the latest scientific breakthroughs and the opportunity to commercialize that research and development (R&D) first. California has some of the top high-end technical talent in the world and its outstanding quality of life and climate afford it the ability to attract human capital from around the globe.

California will remain a center for manufacturing R&D, and many firms co-locate their production facilities close to R&D assets. Additionally, many studies find that workers are more productive when they locate around others with a strong investment in human capital. Our own work and other studies find strong statistical relationships between the depth of human capital in high-technology manufacturing sectors and state and regional growth. Here, too, California has many advantages over other states.

Nevertheless, there are limits to the extent to which these assets can attract or even retain manufacturing production facilities in the state. California has many comparative disadvantages in business-cost areas. As the accompanying table displays, California is among the highest cost-of-doing business states in the country and its relative position has deteriorated in recent years.

High Cost States
2001 Cost of Doing Survey

	Connecticut	Mass.	California	New York	New Jersey
Wage Cost	128.45	124.96	116.62	128.19	123.84
Tax Burden	113.68	107.16	123.68	101.36	91.69
Electricity Cost	139.06	108.97	193.60	91.70	98.49
Industrial Space	223.08	224.01	140.40	196.82	152.33
Office Space	161.52	257.70	122.20	255.52	142.36
Composite Index	138.20	135.50	132.20	130.60	117.70

Source: CB Richard Ellis, Energy Information Administration, Milken Institute.

California's manufacturing sector has higher productivity levels than many other states and can afford to pay wages above the national average. California's wage costs are more than 16 percent above the national average. Productivity is largely tied to the industrial mix and the age of the capital stock. If higher business costs reduce the rate of new investment, the age of the capital stock will rise relative to other states and harm long-term state productivity. New York, New Jersey and Massachusetts are the only states with higher wages than California.

California's tax burden is approaching levels that make it difficult for manufacturers to produce their products at profitable levels in the state given the immense competitive pressures stemming from globalization. Here, we define the tax burden in a broad manner: the ratio of total state and local taxes, personal as well as business-related, to state personal income, relative to the national average of this ratio. We define it broadly because manufacturing firms must examine the direct tax burden placed on them, but also on their employees in determining where to allocate their production activities. Why? Because if a state places a high tax burden on labor, manufacturers will need to pay their employees higher wages in the state to offset some of the higher tax burden.

Among major manufacturing states, only Minnesota has a higher tax burden than California. California's tax burden is nearly 24 percent above the national average. More specifically, California's corporate tax burden is almost 40 percent above the national average. Massachusetts and New Jersey are the only states with a corporate tax burden higher than California – 50 and 42 percent, respectively, in excess of the national average. Meanwhile, California's overall tax burden is the second highest of any western state.

Western States

2001 Costs of Doing Business Survey

	Wage Cost	Tax Burden	Electricity	Industrial (Real Estate)	Office (Real Estate)	Business Cost Index
California	116.62	123.68	193.60	140.40	122.20	132.20
New Mexico	79.47	145.63	146.77	159.12	89.77	113.3
Colorado	105.10	80.12	82.15	147.69	123.20	101.8
Washington	107.69	103.36	103.02	29.35	162.03	101.0
Nevada	94.36	93.94	167.39	17.30	10.79	93.3
Utah	82.90	114.09	150.21	12.05	101.32	93.1
Arizona	93.11	96.41	105.95	22.47	156.01	91.8
Oregon	93.09	93.42	113.33	20.08	110.39	89.8

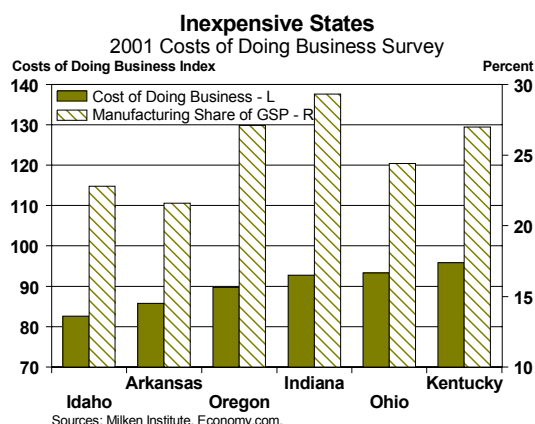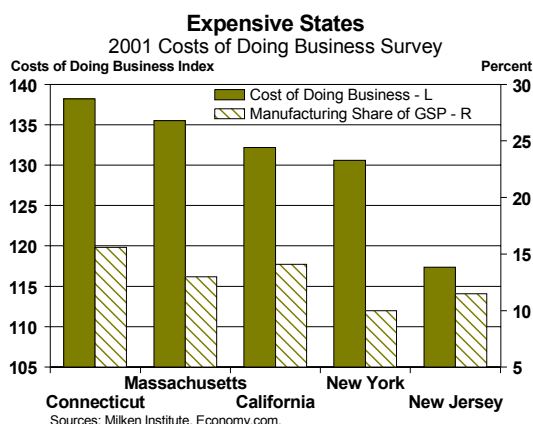Sources: CB Richard Ellis, Energy Information Administration, Milken Institute

California has other business-cost disadvantages relative to other states, as well. Electricity costs have been higher than most states for many years, but the recent electricity crisis — and the subsequent disproportionate rate increases on industrial users — harmed its cost disadvantage even more. With the recent rate increases,

electricity costs in California are nearly double the national average and the highest in the country. Industrial space costs are 40 percent above the national average in California, and, ironically, this is the state's best competitive ranking versus other high-cost states. Office space costs in California are 22 percent above the national average.

By applying weights to the above factors, a composite cost-of-doing business index was created. California's composite business costs are 32 percent above the national average. Connecticut's business costs are 38 percent and Massachusetts's are 36 percent above the national average. They are the only states with higher business costs than California. The importance of business costs and taxes to the manufacturing sector can be seen when comparing manufacturing's share of gross state product (GSP) in high-cost states to low-cost states. As displayed in the accompanying charts, manufacturing's share of GSP in low-cost business states averages around 25 percent, while in high-cost states, its share is less than 12 percent.

Expensive States
2001 Costs of Doing Business Survey
Sources: Milken Institute, Economy.com.

Inexpensive States
2001 Costs of Doing Business Survey
Sources: Milken Institute, Economy.com.

There are broader economic equity and societal issues with respect to maintaining a solid manufacturing production base in California than the aggregate numbers alone would imply. Manufacturing provides well-paying jobs with upward mobility for many immigrants and their children and grandchildren. Manufacturers provide training opportunities for entry-level workers that allow them to move into management positions or, at least higher-skilled and better-paying positions. A manufacturing job is a means to enter the middle class and send sons and daughters to post-secondary education. For California to avoid becoming a state of haves and have-nots, manufacturing must play a role by creating jobs for its citizens, thus it is important that state policy officials recognize that burdening manufacturers with higher costs limits their ability to create jobs in the state.

A Brief History of California's Manufacturing Sector

The role of the manufacturing sector has always been vital to California's economy. For nearly a century, the sector has sustained a pattern of balanced growth, unlike many other states in the union. Most look to the state's comparative advantage, which first served as the catalyst for pushing California manufacturing through periods of positive transformation. California's own resources and ability to conduct international trade early in the 20th century gave it access to markets around the world and the best manufacturing practices.

With a large labor pool, entrepreneurship flourished, and the state entered into the higher value-added manufacturing industry by the mid-1930s. This transition began with aircraft manufacturing. Progress seemed to come naturally and abundantly. By 1947, California's aircraft manufacturing industry produced nearly one-half of the nation's total aircraft production output. Since then, California has always associated its manufacturing sector with high-technology research and development. As manufacturing production thrived, the state economy went through a long period of expansion.

Born out of the innovations of such pioneers as Hewlett and Packard, the electronics manufacturing industry created the next burst of growth, rivaling its aircraft predecessor. By the early 1960s, California was well on its way to becoming the undisputed leader of value-added manufacturing. Twenty years after California manufacturers dominated aircraft production in the nation, the electronics industry had accomplished the same feat by 1967.

The growing presence and domination of high-tech manufacturing further integrate and reinforce the state's position as the region where ideas and designs can be placed in the hands of experienced manufacturers to produce and sell to billions of people worldwide. Intel, HP, Apple Computer, Cisco and many others exemplify this process. One can speculate that had there not been a capable manufacturing sector in California, there would not have been as many famous research and development firms and university-based research institutions located in the state.

The birth of Silicon Valley in the 1970s as a haven for semi-conductors and computer start-ups reinforced California's strength in high value-added manufacturing. The migration of engineers, data processing and information technology professionals from the research "hotbed" of Boston and other well-known regions to Northern California seeded the success and the domination of California high technology in the world. Among some of the reasons why talent and manufacturing firms migrated to the state was the ease of starting a small firm in California. California provided an environment where burdens on producers were far lower than some states in the Northeast, such as Pennsylvania and Massachusetts, and the Midwest. With the

influx of such firms and technology-savvy entrepreneurs, high-tech manufacturing employment reached over 100,000 in 1975, doubling by 1980. That year, California became the nationwide leader in high value-added manufacturing.

California vs. United States
Manufacturing Employment

Index 1983=100

Source: BLS, WEFA.
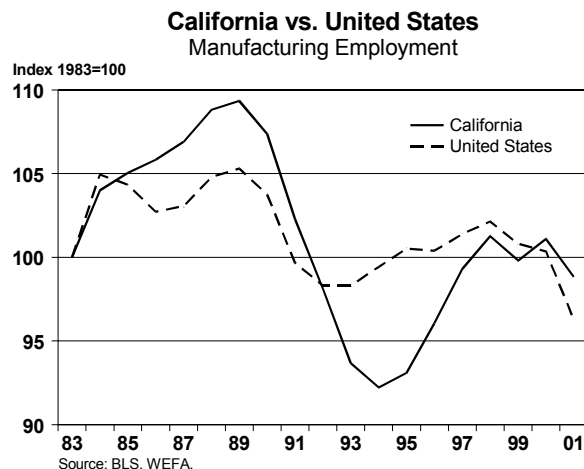
Since 1980, California's leading industries have concentrated in the high-tech sector. For example, computer and data processing and electronic equipment industries replaced federal government and hospitals as the number one and two spots statewide in terms of industry output. A great deal of California's high-tech industry involves manufacturing, and, since 1994, has been a major source of economic growth.

The presence of dominant high-tech manufacturing firms in California benefits smaller manufacturing firms across urban areas because close proximity gives them access to the latest manufacturing techniques and technology. The growth and survival of these small to medium-size manufacturing firms depends heavily on the fortunes of the larger firms. Many of these small to medium-size manufacturing firms, located in immigrant areas and poor urban centers, are suppliers and subcontractors of these large firms.

The importance of the manufacturing sector goes beyond its high productivity measurement. Its contribution to the regional economy is essential. Manufacturing firms, big and small, provide better pay and access to technical and professional training for new workforce entrants and newly arrived immigrants. The average annual pay for a typical California manufacturing worker was $57,000 in 2000, while the annual average wage income for a typical wage earner in the state was $40,000. The gap in wage income between a skilled electronic and equipment worker and an average wage earner (including all industry sectors) can be as wide as 100 percent. While an industrial machinery and equipment worker earned more than $100,000, a typical service provider earned only $40,000.

Output of California Industry
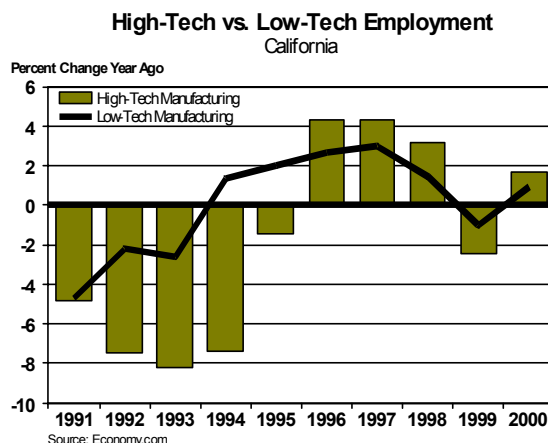Billions of 1996 Dollars

Manufacturing Sector

	1980 US$	2000 US$	Percent Change 1980-2000	Share of U.S. 2000
Durable Goods	37.9	187.9	395.8	18.2
Stone, Clay, & Glass	2.6	3.3	27.9	8.8
Primary Metals	2.8	3.4	21.9	5.2
Fabricated Metal Prods	6.5	7.4	14.2	7.7
Industrial Machinery	4.3	61.6	1333.5	25.0
Electronic Equipment	5.4	78.6	1355.9	23.4
Transportation Equip	5.0	13.7	173.5	7.9
Instruments	9.8	15.4	57.1	32.1
Miscellaneous	1.5	4.4	194.8	16.5
Nondurable Goods	38.1	64.6	69.5	10.1
Food Processing	10.6	13.3	25.6	11.5
Tobacco	0.0	0.0	0.0	0.0
Textiles	0.4	1.0	143.3	4.4
Apparel	2.2	4.9	121.9	22.0
Lumber & Wood Prods	3.7	3.1	-16.8	7.7
Furniture & Fixtures	2.0	2.5	22.7	10.1
Paper Products	2.4	2.8	15.3	5.0
Printing & Publishing	9.0	9.9	9.7	12.1
Chemicals	4.1	14.9	264.4	8.6
Petroleum Products	1.9	7.9	317.1	20.1
Rubber & Plastic Prods	1.5	4.1	174.9	7.5
Leather Products	0.3	0.2	-23.8	5.8
Total Manufacturing	75.7	252.5	233.6	15.1

Source: Economy.com

Looking broadly at California's manufacturing sector since 1980, several changes have occurred. For instance, defense cutbacks in the early 1990s nationally were felt nowhere as severely as in California. Led by a rapid decline in manufacturing, it acted as a shock to the state economy, sending it into a deep and long period of recession. By 1993, manufacturing employment fell at a rate that far exceeded the U.S. average. The hardest hit manufacturing sector was aerospace, causing giants such as Hughes and Lockheed to close plants throughout the state. This period illustrated two important lessons for California's economy: first, the negative implications of overdependence on one industry (aerospace and aircraft), and second, the importance of the manufacturing sector to the state economy despite a rapid ascension of the service and entertainment sectors.

Since the recession of the early-1990s, the state has diversified its economy, yet remains highly dependent on high-tech manufacturing ranging from computers to electronic equipment and biotech. Whereas high-tech manufacturing in the state is largely driven by computers and machinery, electrical equipment, and instruments, these sectors still face volatile periods stemming from high innovation and uncertainty. The global downturn in the high-tech sector in the past year-and-a-half has caused production to contract. Increasingly, high-tech manufacturing firms have had to reduce their size, cut costs and seek out lower-cost production centers.

High-Tech vs. Low-Tech Employment
California

Percent Change Year Ago

High-Tech Manufacturing
Low-Tech Manufacturing

Source: Economy.com

The California manufacturing industry has maintained its role as leader, not only in high-tech, but in the low-tech sectors as well. Increased immigration to the state has fostered a substantial labor pool in both high and low tech. However, it is in low tech where this labor pool has really impacted growth. This is evident in such sectors as apparel, where, in California's urban areas, an informal economy has mushroomed in the manufacturing of clothing and similar goods over the past decade.

The apparel industry doubled its output between 1980 and 2000 and currently represents 22 percent of total U.S. output. Even in times of economic downturn, apparel and other low-skill manufacturing sectors have helped keep California ahead. In 2000, low-tech manufacturing grew almost 2 percent. Potentially, California faces economic polarization as the low tech and high tech manufacturing sectors experience strong growth with little growth in the manufacturing sectors in between.

Current Conditions

California's manufacturing sector is a vital part of the state's economy, employing 13 percent of the state's work force and producing 14 percent of California's gross state product (GSP). A substantial portion of the state's high-tech industrial base stems from the manufacturing sector, which produces much of the nation's computers and related products, and office, communications and electronic equipment. These industries distinguish California from all states as a high-tech region. Such industries facilitate further opportunities in research and development, and ultimately inject wealth into the economy.

The service and retail sectors also rely heavily on manufacturing as the latter opens doors for job creation in those sectors. In March 2001, California's manufacturing sector employed 1,951,600 workers, whereas in April 2002 that number declined to 1,822,300. This resulted in a total loss of 129,300, or 6.6 percent, of all manufacturing jobs in the past year.

Manufacturing Employment
California

Percent Change, Year Ago

Sources: WEFA, BLS.

Manufacturing Sales Tax Reduction

In an attempt to re-energize California's manufacturing sector, the California Manufacturers & Technology Association (CMTA) has proposed three economic stimulus measures. The focus of this report is to analyze the impact of one of those three measures: a reduction in the state's 5 percent sales tax for purchase of manufacturing equipment and telecommunications equipment used in the manufacturing process. In this study, we also estimate the impact of a three-percentage-point reduction in this tax from 5 percent to 2 percent.

As previously outlined, high costs of electricity, industrial and office space, and taxes in California make it less attractive to retain, expand or build new manufacturing facilities here. Eliminating or reducing the sales tax on manufacturing equipment would lower capital costs and allow manufacturers to purchase more new equipment more affordably. More importantly, these measures would create skilled jobs and boost the overall performance of the state's economy.

The incentive for the state to adopt the tax change is to give manufacturing firms additional funds necessary to purchase more capital and labor. At the same time, the state would increase its revenues through added personal and corporate income tax receipts. Over time, this should offset and surpass the amount lost in sales tax revenues. Reducing the sales tax does come at a cost. In such a scenario, the state government would have to forego a certain amount of revenue every year.

California is among four states that currently tax the purchases of manufacturing and telecommunications equipment. Alabama, South Dakota and Wyoming are the other three. However, comparison is difficult since they all differ in terms of tax structure and incentives.

South Dakota does not have a corporate, personal income or personal property tax as California does. One can understand, then, why South Dakota is so dependent on its sales tax. According to the U.S. Department of Commerce, 2000 Annual Survey of State Government Tax Collections, South Dakota had the lowest state per-capita taxes in the nation, while California was the fifth most expensive.

Alabama offers a wide range of business incentives targeted at promoting economic growth. Alabama offers a Corporate Income Tax Credit and Job Creation Tax Credit, allowing companies to offset taxes owed to the state. Alabama also offers sales and use tax exemptions of up to 10 years on all building materials, machinery and equipment to new or expanding industries. Finally, Wyoming has neither a corporate nor personal income tax. Although Wyoming imposes a sales tax on manufacturing equipment, it offers a wide variety of grants stemming from community development to workforce training.

Employment and Gross State Product

Share of State Total

State	Percent Share of Employment	Percent Share of GSP
Wyoming	4	7
South Dakota	12	12
Alabama	17	17
California	13	14

Source: WEFA, BLS.

In addition to reducing the tax on purchases of manufacturing and telecommunications equipment in California, the California Manufacturers & Technology Association has proposed increasing the manufacturers' investment credit (MIC) from 6 percent to 7 percent. This gives firms an incentive to build new or expand existing manufacturing plants.

The purpose of the MIC is to provide tax benefits to businesses that purchase machinery and equipment used primarily in the manufacturing process. (However, the manufacturers' investment tax credit may not apply to those businesses that do not have positive tax liabilities, a common characteristic among new businesses with large start-up expenses). While the manufacturers' tax credit can add some incentives for well-established businesses, a sales tax reduction would equalize tax treatment between new and existing businesses and encourage new manufacturers to locate in California.

Aside from the MIC, California also offers a Research and Development (R&D) tax credit intended for those businesses engaged in high-tech, biotech and aerospace activity. In 1999, Gov. Gray Davis signed a bill that increased the R&D tax credit from 11 percent to 15 percent of the expenses over a specified percentage of the taxpayer's average annual gross receipts, resulting in a cumulative tax relief of $29 million over a four-year fiscal period. Research and development activities will ultimately drive California's economic future, and it is important to promote growth through such incentives.

California also offers a Manufacturing Enhancement Area (MEA) program to those areas that have triple the unemployment rate of the state. This program's focus is to stimulate job creation in those areas by reducing local permitting fees, streamlining local regulatory controls and allowing companies to earn more than $26,000 in state tax credits for each qualified employee they hire. The areas which the MEA pertains are in the cities of Brawley and Calexico, both in Imperial County.

> *Case Study*
>
> *A manufacturers' sales tax exemption proved to be successful in the state of Washington. According to the Association of Washington Business (AWB), manufacturers invested $1.8 billion in new equipment between 1995 and 1997, the first three years the exemption was in effect. During the first four years that the exemption was in effect, 58,100 new manufacturing jobs were created. Although the state lost tax revenue in the first few years of implementation, by 1998 the pendulum swung in the state's favor. It is estimated that between 2000 and 2005, net tax revenues to the state will rise by $2.4 billion.*
>
> *Another business incentive aimed at attracting firms is taking place in New Mexico. Currently, New Mexico is offering the "New Mexico Incentive Package," particularly targeted at the aircraft manufacturing industry. This combination of incentives is expected to save companies in excess of $100 million. Special legislative action taken to exempt the sales tax on aircraft was unanimously approved and signed into law within seven days following the proposal. The package also includes a one-time manufacturing tax credit on equipment, an in-plant training reimbursement of up to 50 percent of wages for half a year, 20-year tax abatement on land, building and equipment through industrial revenue bonds, and a heavily discounted facility lease aimed at delaying brick and mortar expenditures.*

Taxable Base

California's taxable base from the purchases of manufacturing equipment is determined by the total value of capital expenditures on manufacturing and telecommunications-related equipment. This equipment is utilized in several manufacturing industries, but particularly in computers and machinery, electrical equipment, and instruments.

In 2000, total capital expenditures on manufacturing equipment were $8.9 billion, comprising of 53 percent of all capital expenditures in the state. Relatively speaking, 14 percent of the nation's capital expenditures on manufacturing and telecommunications-related equipment were spent in California, whereas 11 percent of the nation's total capital expenditures were spent in the state.

Capital Expenditures

In US$ Billions, 2000

Manufacturing Industry	California	US
Machinery	0.928	9.308
Computer & Electronic Product	6.068	28.164
Electrical Equip., Appliance, & Component	0.350	3.912
Transportation Equipment	0.919	16.905
Misc. Manufacturing	0.635	4.118
Total	$8.9	$62.4

Source: U.S. Census Bureau, Annual Survey of Manufactures

Two alternative scenarios were run reducing the sales tax on purchases of manufacturing and telecommunications equipment — one by exempting such sales
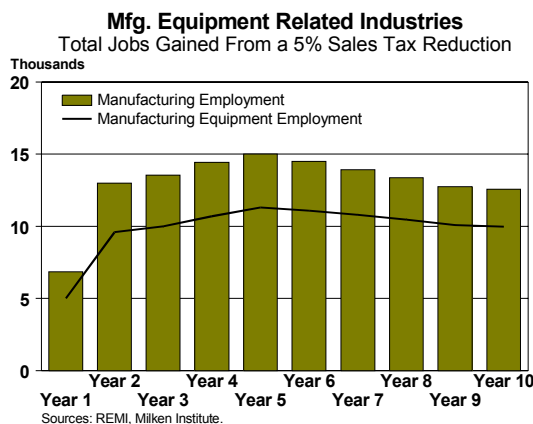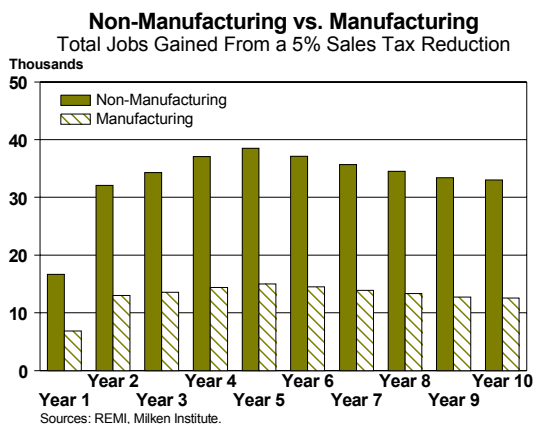
from the 5 percent tax, described in this report as the "5% Sales Tax Reduction," and the other by reducing it by three percentage points to 2 percent, described as the "3% Sales Tax Reduction." The economic impact was evaluated over a 10-year period.

Impact of 5 Percent Tax Reduction on Manufacturing Equipment

Eliminating the 5 percent sales tax on manufacturing equipment results in an average of 50,000 new jobs per year over the next 10 years, of which 14,000 would be created in the manufacturing sector. Taking into account the multiplier effect, for every one job created in the manufacturing sector, more than 3.5 additional jobs are created in other sectors of the economy. From those 14,000 created in manufacturing, nearly 89 percent are associated with jobs in the computer and machinery, electrical equipment, and instruments industries (see graphs below). This is largely due to the fact that manufacturers would be decreasing their capital costs on equipment mainly in those sub-industries.

The services sector, heavily dependent upon manufacturing, gains, on average, a total of 14,000 jobs per year under this scenario. Manufacturing output increases on average by $7.5 billion per year, accounting for nearly 70 percent of the total increase in output. Finally, gross state product begins to grow faster, reaching 0.45 percent per year relative to the baseline by the fifth and subsequent years.

The baseline refers to the scenario in which no reduction of the sales tax takes place allowing one to draw numerical comparisons should the reduction be applied.

Non-Manufacturing vs. Manufacturing
Total Jobs Gained From a 5% Sales Tax Reduction
Sources: REMI, Milken Institute.

Mfg. Equipment Related Industries
Total Jobs Gained From a 5% Sales Tax Reduction
Sources: REMI, Milken Institute.

In examining the results of the impact as a snapshot, particular attention should be paid to the fifth year after the reduction has been implemented as the stimulus works its way through the state's economy. The table below reveals a 0.28 percent increase from the baseline, or a gain of 56,960 jobs in the fifth year of the reduction. This is also the period in which employment growth peaks as a result of the sales tax reduction. Higher employment in manufacturing and other sectors causes the wage rate to

increase in California, reducing the state's competitive position relative to others; employment drifts downward somewhat before stabilizing.

By the fifth year, manufacturing consists of 26 percent of the expected increase in jobs in the state, with 19 percent attributed to machinery and computers, electrical equipment, and instruments. Also, manufacturing output increases by 0.93 percent or $7.7 billion from the baseline in the fifth year of the sales tax reduction. More interestingly, one can clearly see the importance of the multiplier effect. The growth in employment spreads widely to all nonmanufacturing sectors.

Impact of 5% Sales Tax Reduction on Manufacturing Equipment
Difference From Baseline, At Year 5

Industry	Employment (Thousands)	Output (Billions, 92$)
Total	**56.960**	**10.890**
Manufacturing	**15.010**	**7.670**
Machinery & Computer	**3.093**	**3.405**
Electrical Equipment	**5.170**	**2.416**
Instruments	**3.035**	**0.864**
Non-Manufacturing	**41.950**	**3.220**

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census

In the fifth year of the reduction, California's economy gains 15,240 jobs in the services sector, amounting to 27 percent of the total contribution of job gains. As the manufacturing sector expands, it brings along with it more high-skilled and low-skilled jobs. Most of this may be attributed to migration of workers, families and, in general, higher population growth. Retail trade, construction and wholesale trade are the three other big gainers with job gains of 8,373, 4,747 and 4,139, respectively.

As more families migrate into the state, demand for housing may rise and create opportunity for more construction activity. Additionally, more industrial space will be built. With higher economic activity, markets would expand and bring forth an increased demand in retail and wholesale trade. An reduction of the 5 percent tax may result in an increase in the productivity of the manufacturing process, establishing more affordable R&D sites, henceforth creating opportunities for new technological innovations.

Impact of 5% Sales Tax Reduction on Manufacturing Equipment

Non-Manufacturing Sectors, Difference From Baseline, At Year 5

Industry	Employment (Thousands)	Output (Billions, 92$)
Mining	0.099	0.021
Construction	4.747	0.401
Transportation & Public Utilities	1.984	0.364
Finance, Insurance, Real Estate	3.482	0.695
Retail Trade	8.373	0.456
Wholesale Trade	4.139	0.598
Services	15.240	0.961
Agriculture, Forestry, Fishing	0.485	0.011

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census

By the third year following enactment, a 5 percent sales tax reduction on manufacturing equipment would result in revenue gains of $517 million due to higher economic activity for the state government. So although the state would have foregone $478 million of sales tax revenue without the manufacturing sales tax in effect in the third year, California's net tax revenue is $39 million higher.

The diagrams below show that even though the state's net revenues would be negative in the first couple of years were the full tax reduction to be implemented, the gains in revenue would offset the loss by the third year. After the third year, the state would actually have higher tax revenues from other sources a result of the sales tax reduction.

Projected State Revenues

Change in Revenues From a 5% Sales Tax Reduction

US$ Billions

Sources: REMI, Milken Institute.

Projected State Net Revenues

Change in Net Revenues From a 5% Sales Tax Reduction

US$ Billions

Sources: REMI, Milken Institute.
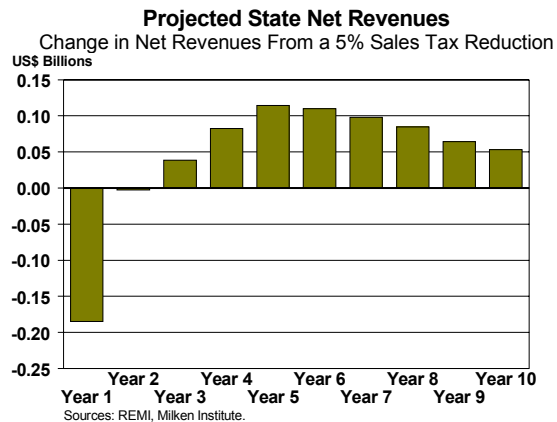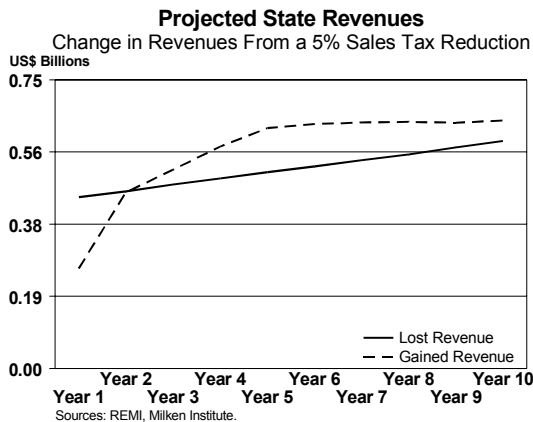
The diagram below illustrates that total personal income would grow at a faster rate than total employment relative to the baseline by the second year. Wages per worker would increase, creating a positive spillover effect in the economy. Higher paying jobs attract high-skilled workers from other states and countries, thus creating a wealth

effect. This is why state personal income tax receipts rise so quickly after the reduction is implemented.

Income Gains More Than Employment
Percent Change From Baseline, 5% Sales Tax Reduction

Sources: REMI, Milken Institute.
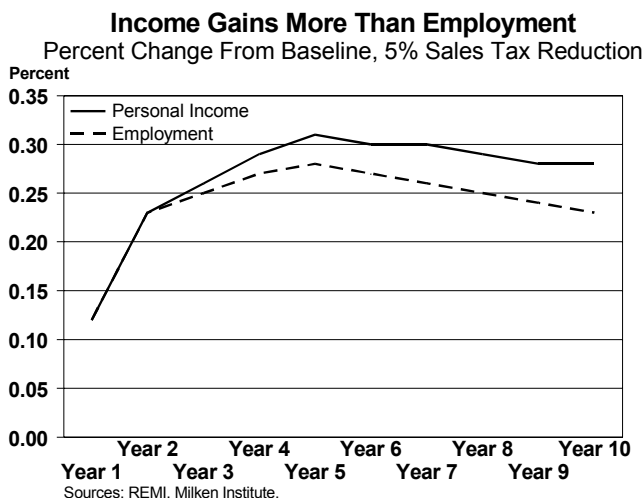
Impact of Reduction of Tax on Manufacturing Equipment to 2 Percent

A reduction of the tax by three percentage points from 5 to 2 percent on the purchase of manufacturing and telecommunications equipment would produce jobs by making additional funds available for capital equipment investment. A 3 percent sales tax reduction on manufacturing equipment results in an average of 32,000 new jobs per year, including 8,000 in the manufacturing sector. The services sector gains 8,500 jobs per year, on average. Manufacturing output increases by an average of $4.5 billion a year, accounting for nearly 70 percent of the total gain in output.

The diagram below left compares the difference in jobs gained due to a 3 percent sales tax reduction on purchases of manufacturing equipment with that of a 5 percent reduction. Most notable is the difference in slopes, or the rate of change in job gains. A 3 percent reduction results in a more moderate job increase, whereas a 5 percent reduction is felt almost immediately. In the 5 percent and 3 percent scenarios, the number of jobs gained would peak by the end of the fifth and fourth years, respectively. This trend illustrates that with a 5 percent reduction, the gain in job growth would continue to increase positively for one additional year.

Total Employment
Total Jobs Gained as a Result of Sales Tax Reduction

Sources: REMI, Milken Institute.

Non-Manufacturing Sectors, At Year 5
Total Jobs Gained as a Result of Sales Tax Reduction

Sources: REMI, Milken Institute.
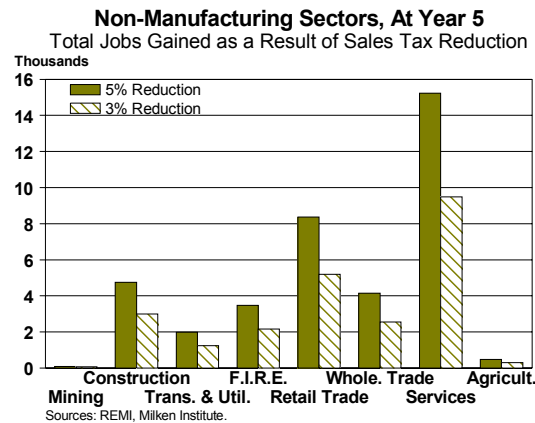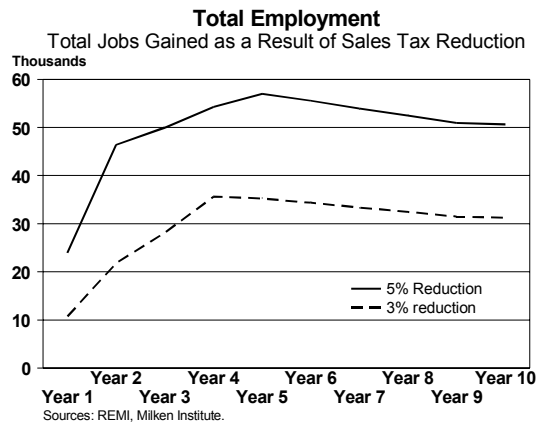
In year five after the implementation of a 3 percent reduction, total jobs increase by 35,280, or 0.17 percent relative to the baseline. Manufacturing jobs rise by 9,228, while nonmanufacturing jobs jump by 26,002. The majority, or 74 percent, of the manufacturing job gain in the fifth year is attributed to the computer and machinery, electrical equipment, and instruments industries. The trend in the number of job gains due to a 3 percent reduction of the sales tax on manufacturing equipment reflects the relative proportionate increase in the 5 percent scenario. The table below illustrates the impact on employment and output as a result of a 3 percent reduction in the tax.

Impact of 3% Sales Tax Reduction on Manufacturing Equipment
Difference From Baseline, At Year 5

Industry	Employment (Thousands)	Output (Billions, 92$)
Total	**35.230**	**6.685**
Manufacturing	**9.228**	**4.508**
Machinery & Computer	**1.916**	**2.094**
Electrical Equipment	**3.152**	**1.462**
Instruments	**1.845**	**0.520**
Non-Manufacturing	**26.002**	**2.177**

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census

As in the 5 percent scenario, the number of job gains is widely spread throughout nonmanufacturing sectors by the fifth year. Similarly, those sectors that are influenced the most consist of services, retail trade and construction with jobs gains of 9,479, 5,197, and 3,000, respectively (see the following table).

Impact of 3% Sales Tax Reduction on Manufacturing Equipment
Non-Manufacturing Sectors, Difference From Baseline, At Year 5

Industry	Employment (Thousands)	Output (Billions, 92$)
Mining	0.062	0.013
Construction	2.999	0.253
Transportation & Public Utilities	1.235	0.226
Finance, Insurance, Real Estate	2.163	0.430
Retail Trade	5.197	0.283
Wholesale Trade	2.553	0.369
Services	9.479	0.597
Agriculture, Forestry, Fishing	0.304	0.007

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census

By the fourth year, a 3 percent sales tax reduction on manufacturing equipment results in revenue gains of $358 million due to higher economic activity for the state government. Although the state would have foregone $298 million in sales tax revenue without the full manufacturing sales tax in the fourth year, California's net tax revenue is $60 million. Compared to the 5 percent scenario, the state revenue gained from the tax reduction would take one more year until it offset all revenue lost. Due to higher economic activity and in particular, higher increases in employment relative to the baseline, state revenues are impacted more in the 5 percent scenario, and as a result respond more quickly in offsetting lost revenues.

Projected State Revenues
Change in Revenues From a 3% Sales Tax Reduction

Sources: REMI, Milken Institute.

Projected State Net Revenues
Change in Net Revenues From a 3% Sales Tax Reduction

Sources: REMI, Milken Institute.
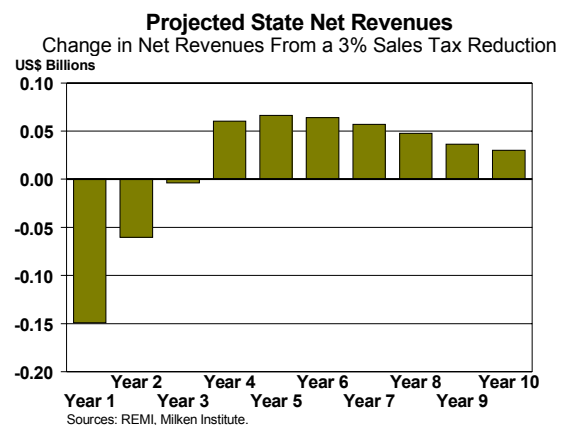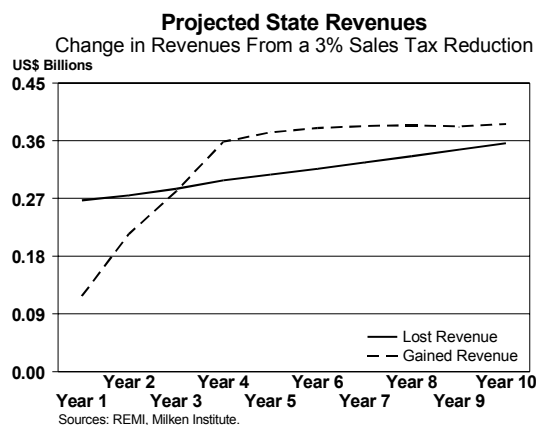
As explained by the diagram below, in the 3 percent scenario, it would take up to four years until total personal income begins to grow at a faster rate than total employment relative to the baseline. Compared to a 5-percent reduction, a 3-percent reduction would take two more years for wages per worker to rise.

Income Gains More Than Employment
Percent Change From Baseline, 3% Sales Tax Reduction

Sources: REMI, Milken Institute.
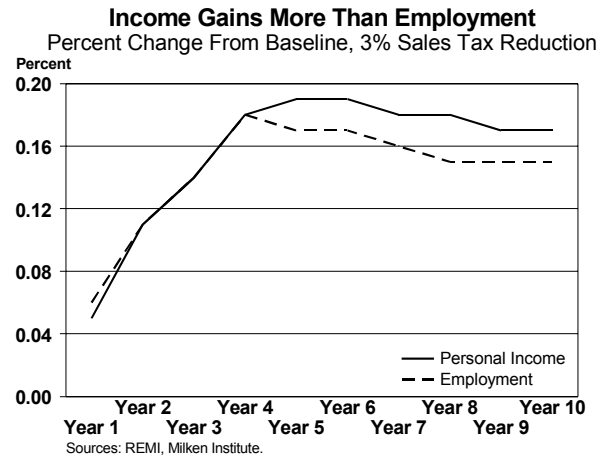
Trade Implications

International trade is a pillar of the California economy. International commerce and competition, like technological progress, are key to its economic growth, as is the continuous process of structural change. Utilizing California's competitive advantages in several industries, trade permits the maximum exploitation of economies of scale and scope.

California's proximity to Mexico, Latin America and the Pacific Rim make it an attractive location in terms of international trade and investment. As countries in these regions continue to develop their technological infrastructure, demand for technological devices increases dramatically. Despite the Asian Crisis in 1997-98, strong foreign demand for high-tech products boosted California's exports of computer-related equipment over recent years. Major California-based companies such as Hewlett-Packard, Intel Corporation and Apple Computer produce computer products used worldwide.

In 2000, export of computers and machinery, electrical equipment and instruments totaled $87.4 billion, accounting for a remarkable 59 percent of all California merchandise exports. The chart below left illustrates the extent to which California's computer and machinery industry has been growing faster than the United States average.

A sales tax reduction on manufacturing and telecommunications equipment may indirectly allow for less costly means of production. This could strengthen California's comparative advantage in that area, and therefore result in more vigorous trade activity with other nations.

Exports - Computer Equipment
1992-2000

Index 1992Q1=100

Sources: MISER; RFA

Net Exports
Total Output Gained as a Result of Sales Tax Reduction

US$ Billions

Sources: REMI, Milken Institute.
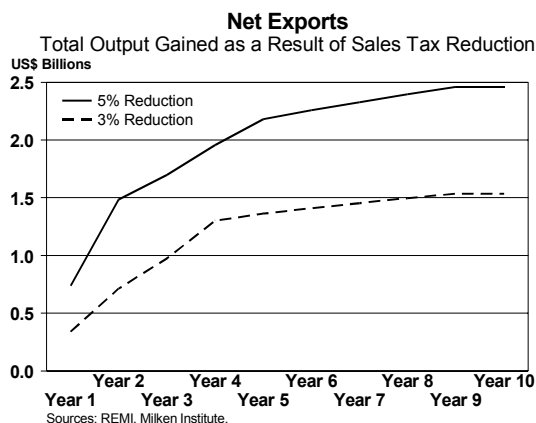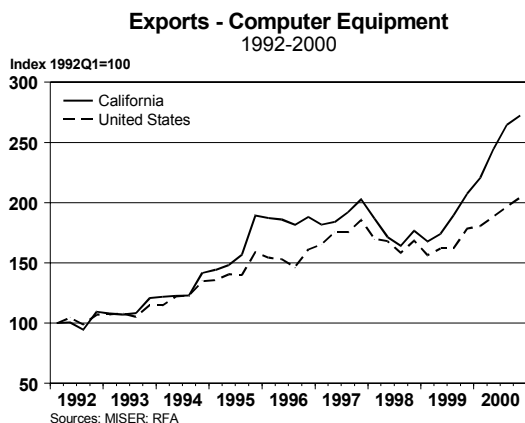
The graph above right explains the impact on net exports as a result of a sales tax reduction on manufacturing equipment. The growth trend is similar to that of job growth in both the 5 percent and 3 percent scenarios. On average, net exports increase by $3 billion and by $1.9 billion per year given 5 percent or 3 percent reductions respectively, over the next 10 years.

Based on our results, we can conclude the following:

- This change in tax policy would contribute to reducing the cost disadvantages that California's manufacturing producers face with other western states and other countries. Higher capital investment improves the productivity of California's manufacturing work force.

- A full or partial reduction from the 5 percent sales tax on the purchase of manufacturing and telecommunications equipment may initially be more costly for the state, but it eventually creates more jobs and higher income, more than offsetting the lost tax revenue due to the reduction.

- From a public policy perspective, the creation of additional manufacturing jobs will propel more workers and families into middle-class status in California. Many of these jobs will be filled by Latino, Asian and other ethnic groups. Additionally, most manufacturing jobs provide benefits such as health care coverage.

- Lastly, because manufacturers are increasingly locating more of their development activities within their production facilities, some of these incremental manufacturing jobs will be in research and development.

REMI Model and Methodology

Regional Economic Models, Inc. (REMI) is used to forecast the effect of regional policy changes. The model incorporates a 53-sector regional structure that is based on the 1987 standard industrial classification (SIC) system. Structured around long-run equilibrium features, REMI is able to substitute factors of production, namely capital and labor, when dealt with changes in the relative factor prices. It includes a built-in Input/Output coefficient matrix pertaining to those 53 sectors used to calculate relative shares of a particular industry. Through its wide range of policy levers, the model is capable of estimating the impact of a change in the state's tax structure.

The goal in our approach is to estimate the economic impact of a reduction in the sales tax on manufacturing equipment. To do so, we must first apply a 5 percent or 3 percent sales tax reduction to the amount of capital expenditure in those related industries, namely computers and machinery, electrical equipment, and instruments. In the 5 percent scenario, this would be 5 percent of $8.9 billion, resulting in $445 million dollars in state revenues. Ultimately, this is also the amount that the state must forego, and the amount manufacturers' funds increase.

This policy change enters the model as a decrease in the capital costs of those industries mentioned above. To find out what portion of those capital costs is allocated to computers and machinery, electrical equipment and instruments, we take their respective capital share I/O coefficients and apply them to their value-added shares of output to attain their appropriate capital share components. Now we have enough information to know how much capital costs would decrease in those selected industries. They are $157 million, $172 million and $116 million for computers and machinery, electrical equipment and instruments, respectively. This adds up to $445 million, the amount manufacturers would be saving under the 5 percent scenario.

Keep in mind, however, that in the actual model the amount taxed in revenue is adjusted for factors such as inflation from year to year. We also assumed that in the first couple of years of the forecast, the effects of this policy change would take place gradually as opposed to immediately, since it would take some time for manufacturers to increase their confidence levels and actually take advantage of the incentive.

Other than decreasing manufacturers' capital costs, it would be necessary to increase the producer's investment spending on durable equipment by $445 million in order to meet the increased supply of manufacturing equipment. Assuming that the price of new equipment stays constant over time, we'd expect to see an increase in the quantity of new manufacturing-related equipment, hence, allowing for a new point of equilibrium. Alternatively, we can say that due to higher employment growth and productivity, markets would expand, resulting in an increased demand in both labor and capital. As a result of increased profitability, manufacturers would be investing more in the face of good news.

Impact of 5% Sales Tax Reduction on Manufacturing and Telecommunications Equipment
Difference From Baseline

Variable	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Employment (Thousands)	**23.920**	**46.370**	**49.960**	**54.250**	**56.960**	**55.540**	**53.920**	**52.470**	**50.970**	**50.630**
Manufacturing	6.853	13.000	13.550	14.420	15.010	14.490	13.920	13.350	12.740	12.570
Machinery & Computer	1.673	2.940	2.892	2.970	3.093	3.014	2.929	2.855	2.776	2.750
Electrical Equipment	2.202	4.305	4.532	4.879	5.170	5.068	4.930	4.778	4.585	4.499
Instruments	1.132	2.335	2.571	2.839	3.035	2.997	2.931	2.840	2.734	2.720
Mining	0.054	0.098	0.099	0.102	0.099	0.089	0.079	0.071	0.063	0.060
Construction	2.418	4.538	4.699	4.839	4.747	4.274	3.805	3.394	3.025	2.796
Transportation & Public Utilities	0.895	1.687	1.788	1.921	1.984	1.897	1.810	1.734	1.663	1.648
Finance, Insurance, Real Estate	1.455	2.832	3.064	3.318	3.482	3.383	3.278	3.188	3.098	3.043
Retail Trade	3.627	7.035	7.501	8.076	8.373	8.053	7.713	7.418	7.132	7.027
Wholesale Trade	1.715	3.314	3.576	3.934	4.139	4.055	3.949	3.847	3.736	3.672
Services	6.292	12.160	13.140	14.400	15.240	14.920	14.620	14.430	14.250	14.360
Agriculture, Forestry, Fishing	0.213	0.410	0.437	0.469	0.485	0.462	0.442	0.426	0.412	0.414
Output (Billions, Fixed 92$)	**3.728**	**7.554**	**8.556**	**9.833**	**10.890**	**11.150**	**11.360**	**11.540**	**11.640**	**12.030**
Manufacturing	2.368	4.910	5.616	6.552	7.379	7.670	7.920	8.129	8.262	8.630
Machinery & Computer	1.083	2.241	2.549	2.997	3.405	3.567	3.712	3.840	3.933	4.097
Electrical Equipment	0.689	1.498	1.758	2.095	2.416	2.564	2.695	2.806	2.885	3.039
Instruments	0.271	0.571	0.667	0.775	0.864	0.891	0.908	0.916	0.916	0.957
Mining	0.010	0.019	0.020	0.021	0.021	0.019	0.017	0.016	0.014	0.014
Construction	0.199	0.371	0.388	0.405	0.401	0.366	0.330	0.299	0.270	0.251
Transportation & Public Utilities	0.144	0.278	0.307	0.342	0.364	0.360	0.354	0.350	0.344	0.350
Finance, Insurance, Real Estate	0.239	0.487	0.561	0.636	0.695	0.706	0.710	0.714	0.714	0.719
Retail Trade	0.189	0.357	0.392	0.431	0.456	0.447	0.437	0.429	0.420	0.419
Wholesale Trade	0.220	0.424	0.481	0.551	0.598	0.604	0.608	0.611	0.611	0.624
Services	0.355	0.699	0.782	0.884	0.961	0.968	0.974	0.985	0.995	1.014
Agriculture, Forestry, Fishing	0.005	0.010	0.010	0.011	0.011	0.011	0.010	0.010	0.010	0.010
Gross Regional Product (Billions, Fixed 92$)	1.860	3.817	4.396	5.107	5.712	5.916	6.090	6.249	6.365	6.575
Personal Income (Billions, Nominal $)	1.236	2.556	3.012	3.482	3.880	4.029	4.136	4.227	4.295	4.425
Disposable Personal Income (Billions, Fixed 92$)	0.689	1.368	1.569	1.766	1.924	1.957	1.975	1.988	1.993	2.029
Population (Thousands)	6.594	20.600	33.570	44.280	54.320	62.410	68.540	73.360	77.080	80.160
Exports (Billions, Fixed 92$)	2.063	4.258	4.875	5.657	6.383	6.663	6.927	7.181	7.402	7.525
Imports (Billions, Fixed 92$)	0.878	1.931	2.216	2.619	3.032	3.224	3.406	3.577	3.720	3.908
Wage Rate (Thousands, Nominal $)	0.022	0.045	0.053	0.061	0.067	0.067	0.067	0.066	0.064	0.063
Additional State Revenues from Increased Economic Activity (Billions, Nominal $)	0.260	0.458	0.517	0.577	0.624	0.635	0.639	0.641	0.638	0.644
Foregone Tax Revenue (Billions, Nominal $)	0.445	0.460	0.478	0.494	0.510	0.525	0.541	0.556	0.574	0.591

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census.

Impact of 5% Sales Tax Reduction on Manufacturing and Telecommunications Equipment
Percent Change From Baseline

Variable	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Employment (Thousands)	**0.12%**	**0.23%**	**0.25%**	**0.27%**	**0.28%**	**0.27%**	**0.26%**	**0.25%**	**0.24%**	**0.23%**
Manufacturing	0.33%	0.65%	0.70%	0.76%	0.79%	0.78%	0.76%	0.74%	0.73%	0.72%
Machinery & Computer	0.71%	1.48%	1.62%	1.76%	1.85%	1.81%	1.77%	1.73%	1.70%	1.68%
Electrical Equipment	0.78%	1.67%	1.86%	2.06%	2.21%	2.21%	2.19%	2.18%	2.15%	2.15%
Instruments	0.63%	1.34%	1.52%	1.69%	1.81%	1.82%	1.82%	1.81%	1.81%	1.80%
Mining	0.15%	0.27%	0.28%	0.29%	0.29%	0.26%	0.24%	0.22%	0.20%	0.19%
Construction	0.23%	0.43%	0.45%	0.46%	0.46%	0.41%	0.37%	0.33%	0.29%	0.28%
Transportation & Public Utilities	0.10%	0.19%	0.20%	0.22%	0.22%	0.21%	0.20%	0.19%	0.18%	0.18%
Finance, Insurance, Real Estate	0.09%	0.17%	0.18%	0.20%	0.21%	0.20%	0.19%	0.18%	0.18%	0.18%
Retail Trade	0.12%	0.23%	0.24%	0.26%	0.26%	0.25%	0.24%	0.22%	0.21%	0.21%
Wholesale Trade	0.19%	0.36%	0.40%	0.45%	0.47%	0.47%	0.46%	0.45%	0.44%	0.44%
Services	0.09%	0.18%	0.19%	0.20%	0.20%	0.19%	0.19%	0.18%	0.17%	0.17%
Agriculture, Forestry, Fishing	0.05%	0.10%	0.10%	0.11%	0.11%	0.10%	0.10%	0.09%	0.09%	0.09%
Output (Billions, Fixed 92$)	**0.21%**	**0.42%**	**0.46%**	**0.51%**	**0.55%**	**0.54%**	**0.54%**	**0.53%**	**0.52%**	**0.53%**
Manufacturing	0.34%	0.71%	0.79%	0.87%	0.93%	0.93%	0.93%	0.92%	0.91%	0.91%
Machinery & Computer	0.72%	1.50%	1.66%	1.81%	1.92%	1.89%	1.87%	1.84%	1.82%	1.80%
Electrical Equipment	0.79%	1.69%	1.91%	2.13%	2.30%	2.32%	2.32%	2.32%	2.31%	2.31%
Instruments	0.65%	1.38%	1.58%	1.78%	1.93%	1.96%	1.99%	2.00%	2.01%	2.02%
Mining	0.15%	0.27%	0.28%	0.30%	0.29%	0.27%	0.25%	0.23%	0.21%	0.20%
Construction	0.23%	0.43%	0.45%	0.47%	0.46%	0.42%	0.37%	0.33%	0.30%	0.28%
Transportation & Public Utilities	0.11%	0.20%	0.22%	0.23%	0.24%	0.23%	0.22%	0.21%	0.20%	0.20%
Finance, Insurance, Real Estate	0.07%	0.15%	0.16%	0.18%	0.19%	0.19%	0.18%	0.18%	0.17%	0.17%
Retail Trade	0.12%	0.23%	0.25%	0.26%	0.27%	0.26%	0.24%	0.23%	0.22%	0.22%
Wholesale Trade	0.19%	0.36%	0.41%	0.45%	0.48%	0.47%	0.46%	0.45%	0.45%	0.44%
Services	0.09%	0.17%	0.18%	0.20%	0.21%	0.20%	0.19%	0.19%	0.18%	0.18%
Agriculture, Forestry, Fishing	0.05%	0.10%	0.10%	0.11%	0.11%	0.10%	0.10%	0.09%	0.09%	0.09%
Gross Regional Product (Billions, Fixed 92$)	0.17%	0.33%	0.37%	0.42%	0.45%	0.45%	0.45%	0.45%	0.44%	0.45%
Personal Income (Billions, Nominal $)	0.12%	0.23%	0.26%	0.29%	0.31%	0.30%	0.30%	0.29%	0.28%	0.28%
Disposable Personal Income (Billions, Fixed 92$)	0.10%	0.19%	0.21%	0.23%	0.24%	0.24%	0.24%	0.23%	0.23%	0.23%
Population (Thousands)	0.02%	0.06%	0.10%	0.13%	0.16%	0.18%	0.19%	0.21%	0.21%	0.22%
Exports (Billions, Fixed 92$)	0.37%	0.76%	0.85%	0.94%	1.01%	1.01%	1.01%	1.01%	1.00%	1.00%
Imports (Billions, Fixed 92$)	0.17%	0.37%	0.41%	0.47%	0.52%	0.53%	0.54%	0.55%	0.56%	0.57%
Wage Rate (Thousands, Nominal $)	0.07%	0.15%	0.17%	0.18%	0.19%	0.19%	0.18%	0.17%	0.16%	0.15%
Additional State Revenues from Increased Economic Activity										
(Billions, Nominal $)	0.15%	0.26%	0.29%	0.32%	0.34%	0.34%	0.33%	0.33%	0.32%	0.32%

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census.

Impact of 3% Sales Tax Reduction on Manufacturing and Telecommunications Equipment
Difference From Baseline

Variable	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Employment (Thousands)	**10.730**	**21.770**	**28.120**	**35.600**	**35.230**	**34.350**	**33.360**	**32.440**	**31.480**	**31.240**
Manufacturing	3.144	6.174	7.654	9.438	9.228	8.925	8.582	8.237	7.863	7.759
Machinery & Computer	0.783	1.419	1.655	1.964	1.916	1.869	1.818	1.773	1.725	1.709
Electrical Equipment	1.037	2.066	2.555	3.164	3.152	3.100	3.022	2.935	2.820	2.771
Instruments	0.524	1.110	1.437	1.827	1.845	1.829	1.794	1.742	1.680	1.674
Mining	0.024	0.045	0.056	0.068	0.062	0.056	0.050	0.045	0.040	0.038
Construction	1.054	2.103	2.660	3.250	2.999	2.701	2.408	2.147	1.911	1.764
Transportation & Public Utilities	0.397	0.789	1.012	1.277	1.235	1.179	1.124	1.076	1.029	1.018
Finance, Insurance, Real Estate	0.657	1.335	1.732	2.193	2.163	2.100	2.035	1.977	1.917	1.881
Retail Trade	1.615	3.292	4.228	5.327	5.197	4.999	4.788	4.599	4.413	4.342
Wholesale Trade	0.751	1.538	2.004	2.571	2.553	2.502	2.438	2.374	2.303	2.262
Services	2.812	5.707	7.457	9.594	9.479	9.276	9.081	8.940	8.809	8.858
Agriculture, Forestry, Fishing	0.095	0.193	0.248	0.314	0.304	0.289	0.276	0.265	0.256	0.256
Output (Billions, Fixed 92$)	**1.696**	**3.573**	**4.818**	**6.419**	**6.685**	**6.853**	**6.988**	**7.100**	**7.160**	**7.400**
Manufacturing	1.093	2.337	3.161	4.257	4.508	4.694	4.853	4.985	5.070	5.298
Machinery & Computer	0.505	1.076	1.448	1.964	2.094	2.196	2.288	2.368	2.426	2.528
Electrical Equipment	0.322	0.715	0.983	1.345	1.462	1.556	1.640	1.710	1.761	1.857
Instruments	0.124	0.269	0.368	0.492	0.520	0.538	0.550	0.556	0.557	0.583
Mining	0.004	0.009	0.011	0.014	0.013	0.012	0.011	0.010	0.009	0.009
Construction	0.087	0.172	0.220	0.272	0.253	0.231	0.209	0.189	0.170	0.158
Transportation & Public Utilities	0.064	0.130	0.174	0.226	0.226	0.223	0.219	0.216	0.213	0.216
Finance, Insurance, Real Estate	0.108	0.229	0.314	0.413	0.430	0.436	0.439	0.441	0.441	0.444
Retail Trade	0.084	0.167	0.221	0.284	0.283	0.277	0.271	0.266	0.260	0.259
Wholesale Trade	0.097	0.197	0.269	0.359	0.369	0.373	0.375	0.377	0.377	0.384
Services	0.158	0.328	0.443	0.587	0.597	0.600	0.604	0.610	0.615	0.625
Agriculture, Forestry, Fishing	0.002	0.005	0.006	0.007	0.007	0.007	0.006	0.006	0.006	0.006
Gross Regional Product (Billions, Fixed 92$)	0.844	1.802	2.467	3.319	3.502	3.631	3.742	3.840	3.912	4.041
Personal Income (Billions, Nominal $)	0.557	1.201	1.668	2.226	2.379	2.476	2.547	2.605	2.648	2.728
Disposable Personal Income (Billions, Fixed 92$)	0.311	0.644	0.874	1.136	1.179	1.201	1.213	1.222	1.225	1.248
Population (Thousands)	2.980	9.559	16.990	25.040	31.960	37.010	41.040	44.210	46.660	48.700
Exports (Billions, Fixed 92$)	0.964	2.055	2.789	3.743	3.958	4.133	4.300	4.458	4.594	4.671
Imports (Billions, Fixed 92$)	0.426	0.942	1.260	1.709	1.851	1.973	2.088	2.195	2.284	2.402
Wage Rate (Thousands, Nominal $)	0.010	0.021	0.029	0.039	0.041	0.042	0.041	0.041	0.040	0.039
Additional State Revenues from Increased Economic Activity (Billions, Nominal $)	0.118	0.215	0.281	0.358	0.373	0.380	0.383	0.384	0.382	0.386
Foregone Tax Revenue (Billions, Nominal $)	0.267	0.275	0.285	0.298	0.307	0.316	0.326	0.336	0.346	0.356

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census.

Impact of 3% Sales Tax Reduction on Manufacturing and Telecommunications Equipment
Percent Change From Baseline

Variable	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Employment (Thousands)	**0.06%**	**0.11%**	**0.14%**	**0.18%**	**0.17%**	**0.17%**	**0.16%**	**0.15%**	**0.15%**	**0.15%**
Manufacturing	0.15%	0.31%	0.40%	0.49%	0.49%	0.48%	0.47%	0.46%	0.45%	0.45%
Machinery & Computer	0.33%	0.71%	0.93%	1.16%	1.14%	1.12%	1.10%	1.08%	1.06%	1.05%
Electrical Equipment	0.37%	0.80%	1.05%	1.33%	1.35%	1.35%	1.34%	1.34%	1.32%	1.32%
Instruments	0.29%	0.64%	0.85%	1.09%	1.10%	1.11%	1.11%	1.11%	1.11%	1.11%
Mining	0.06%	0.12%	0.16%	0.20%	0.18%	0.17%	0.15%	0.14%	0.12%	0.12%
Construction	0.10%	0.20%	0.25%	0.31%	0.29%	0.26%	0.23%	0.21%	0.19%	0.17%
Transportation & Public Utilities	0.05%	0.09%	0.11%	0.14%	0.14%	0.13%	0.12%	0.12%	0.11%	0.11%
Finance, Insurance, Real Estate	0.04%	0.08%	0.10%	0.13%	0.13%	0.12%	0.12%	0.11%	0.11%	0.11%
Retail Trade	0.05%	0.11%	0.14%	0.17%	0.16%	0.15%	0.15%	0.14%	0.13%	0.13%
Wholesale Trade	0.08%	0.17%	0.23%	0.29%	0.29%	0.29%	0.28%	0.28%	0.27%	0.27%
Services	0.04%	0.08%	0.11%	0.13%	0.13%	0.12%	0.12%	0.11%	0.11%	0.11%
Agriculture, Forestry, Fishing	0.02%	0.05%	0.06%	0.07%	0.07%	0.06%	0.06%	0.06%	0.06%	0.05%
Output (Billions, Fixed 92$)	**0.10%**	**0.20%**	**0.26%**	**0.33%**	**0.34%**	**0.33%**	**0.33%**	**0.33%**	**0.32%**	**0.32%**
Manufacturing	0.16%	0.34%	0.44%	0.57%	0.57%	0.57%	0.57%	0.56%	0.56%	0.56%
Machinery & Computer	0.33%	0.72%	0.94%	1.19%	1.18%	1.17%	1.15%	1.14%	1.12%	1.11%
Electrical Equipment	0.37%	0.81%	1.07%	1.37%	1.39%	1.41%	1.41%	1.41%	1.41%	1.41%
Instruments	0.30%	0.65%	0.87%	1.13%	1.16%	1.19%	1.20%	1.21%	1.22%	1.23%
Mining	0.06%	0.13%	0.16%	0.20%	0.18%	0.17%	0.16%	0.14%	0.13%	0.12%
Construction	0.10%	0.20%	0.25%	0.31%	0.29%	0.26%	0.24%	0.21%	0.19%	0.18%
Transportation & Public Utilities	0.05%	0.10%	0.12%	0.15%	0.15%	0.14%	0.14%	0.13%	0.12%	0.12%
Finance, Insurance, Real Estate	0.03%	0.07%	0.09%	0.12%	0.12%	0.12%	0.11%	0.11%	0.11%	0.11%
Retail Trade	0.05%	0.11%	0.14%	0.17%	0.17%	0.16%	0.15%	0.14%	0.14%	0.14%
Wholesale Trade	0.08%	0.17%	0.23%	0.29%	0.29%	0.29%	0.28%	0.28%	0.27%	0.27%
Services	0.04%	0.08%	0.10%	0.13%	0.13%	0.12%	0.12%	0.12%	0.11%	0.11%
Agriculture, Forestry, Fishing	0.02%	0.05%	0.06%	0.07%	0.07%	0.06%	0.06%	0.06%	0.06%	0.05%
Gross Regional Product (Billions, Fixed 92$)	0.08%	0.16%	0.21%	0.27%	0.28%	0.28%	0.28%	0.28%	0.27%	0.28%
Personal Income (Billions, Nominal $)	0.05%	0.11%	0.14%	0.18%	0.19%	0.19%	0.18%	0.18%	0.17%	0.17%
Disposable Personal Income (Billions, Fixed 92$)	0.04%	0.09%	0.12%	0.15%	0.15%	0.15%	0.15%	0.14%	0.14%	0.14%
Population (Thousands)	0.01%	0.03%	0.05%	0.07%	0.09%	0.11%	0.12%	0.12%	0.13%	0.13%
Exports (Billions, Fixed 92$)	0.17%	0.37%	0.48%	0.62%	0.63%	0.63%	0.63%	0.63%	0.62%	0.62%
Imports (Billions, Fixed 92$)	0.08%	0.18%	0.23%	0.31%	0.32%	0.33%	0.33%	0.34%	0.34%	0.35%
Wage Rate (Thousands, Nominal $)	0.03%	0.07%	0.09%	0.12%	0.12%	0.12%	0.11%	0.10%	0.10%	0.09%
Additional State Revenues from Increased Economic Activity										
(Billions, Nominal $)	0.07%	0.12%	0.16%	0.20%	0.20%	0.20%	0.20%	0.20%	0.19%	0.19%

Sources: Milken Institute, REMI Policy Insight, BEA, U.S. Census.